Atopic Dermatitis Due to Sensitivity to Pollen

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• **Observation of 100 patients with atopic dermatitis due to hypersensitivity to pollen over a period of 12 years emphasized certain important diagnostic and therapeutic features. The incidence was higher in females than in males and higher in middle and old age than in the earlier years.**

Pollen dermatitis may be the sole or major manifestation of allergy; 43 patients gave no history of other allergic symptoms. It may involve any or all areas of the body. The site or the distribution of lesions or the nature of the lesions gave no clue as to the diagnosis of pollen sensitivity.

The character of the eruption varied widely from patient to patient and in given patients from week to week at times.

Atopic dermatitis due to pollen sensitivity may be purely seasonal, perennial with seasonal exacerbations or perennial without seasonal variation.

Reactions to skin testing with pollens suspected as allergens may be positive, equivocal or negative. In 58 patients there were positive correlative skin reactions to pollens.

The diagnosis of atopic dermatitis due to pollen sensitivity, and the composition of the desensitizing antigen or antigens, must be based primarily on the clinical history and the area of residence.

Most patients could tolerate only very weak dilutions at the beginning of desensitization therapy. Strong dilutions caused exacerbation of the dermatitis.

Good or excellent results were obtained with perennial pollen desensitization therapy administered over long periods. In 13 patients good results took four to eight years of desensitization therapy. Fifty required less than two years. Tolerance of the patient for a given dose of antigen should determine the maximum dilution used in therapy.

SINCE 1930 observers have reported instances of atopic dermatitis due to airborne allergens.* Rowe reported on the disease in 30 patients in 1936[10] and made another report in 1946.[9] In the more recent report dermatitis of the hands was the major allergic manifestation. The present communication is a report of observations from the diagnostic and therapeutic standpoints in 100 patients, 64 females and 36 males, studied within the past 12 years whose sole or major manifestation of allergy was atopic dermatitis due to pollen sensitivity. In all cases good or excellent results were obtained with desensitization therapy.

Fifty-eight of the patients were in the age bracket 15 to 50 years at the time of onset; 18 were under 15 years of age, the youngest being six months old, and 24 patients were over 50, the eldest being 78.

A history of past or present symptoms of allergic reaction, in addition to the dermatitis for which they sought treatment, was obtained in 57 patients. Seasonal hay fever in 31 patients was most frequently noted. The fact that 43 patients gave no history of any other allergic manifestation emphasized that in some persons the skin may be the only "shock tissue" of allergic response.

The extremities were the most frequently involved areas—sometimes alone, sometimes with other areas of the body besides. The eruption was generalized in 32 patients; confined to the head and neck alone in one; the ears in three; the eyes in two; the face in 12; the trunk in three; and the hands in 16 (Table 2). Localization or distribution of the eruption gave no clue as to the diagnosis of sensitivity to pollen.

The character of the eruption varied widely: Some minute and pin-point lesions, some vesicular and at times vesiculopustular, either discrete or massed in patches or large areas of erythema, edema, dryness, oozing, and pruritus—all these manifestations were observed, some of them in few cases, some in many. The intensity of eruption frequently varied from week to week.

In some cases in this series the atopic dermatitis was purely seasonal, in some perennial with seasonal exacerbations, and in others perennial without strik-

TABLE 1.—*Personal Past and Present History of Allergic Manifestations in 100 Patients*

	No. of Patients
Seasonal hay fever	31
Perennial allergic rhinitis	4
Bronchial asthma—Seasonal	4
Bronchial asthma—Nonseasonal	3
Urticaria	10
Allergic headache	1
Gastrointestinal allergy	4
No other allergic symptoms	43
	100

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*References 2, 4, 5, 6, 7, 9, 11, 12, 13, 15.

ing seasonal exacerbation (Table 3). Ninety of the 100 patients resided in the temperate areas of north central California where, regardless of season, the air is never completely pollen-free. Poa annua, cut flower, cedar, eucalyptus and acacia pollens are present in the air during the late fall and early winter months, thus accounting for the perennial character of the eruption in many persons.

As in all clinically manifest allergy, the sole evidence of pollen sensitivity may be obtained only from careful analysis of the patient's history.[8] In cases in which allergic reaction to pollens is perennial, seasonal exacerbations, if they occur, may not be apparent to the patient at first, and may become apparent to a clinician only after a year or more of observation. The season of onset and the month of the first visit of the patient to the physician frequently offer important diagnostic clues.

Results of skin testing with important pollens and other inhalants to which patients were exposed and with important ingested foods are shown in Table 4. Tests were performed by the scratch, puncture or intradermal methods. Positive reactions to seasonal pollens considered clinically important were elicited in 58 patients and to pollens considered to be of no clinical importance in 18. Twenty-four patients were completely nonreagenic, having no reaction to any of the allergens used in the tests. Scratch or puncture tests with large numbers of seasonal pollens occasionally produced severe exacerbations of the eruption. Hence, in cases in which a high degree of sensitization is suspected, scratch or puncture tests should be limited and extremely weak dilutions of antigens should be employed for intradermal testing.

Because reactions to offending pollens may be strongly or moderately positive, or equivocal, or negative and because skin tests when positive may represent past, present, or potential allergic sensitivity, analysis of the history becomes the ultimate criterion for establishing the diagnosis of pollen sensitivity and for appropriate desensitization therapy.

Frequently patients with pollen dermatitis have a high degree of sensitization, necessitating the use of extremely weak dilutions of desensitizing antigen for institution of therapy and frequently for maintenance therapy as well. In this series 67 patients could tolerate initial dilutions no stronger than of 1:5 billion. Thirty-three patients had tolerance for dilutions between 1:500 million and 1:50,000. Antigen dilutions stronger than 1:50,000 were not given initially in any patient.

The strength of the final desensitizing antigen used was 1:5 million billion in one patient, between 1:50 thousand billion and 1:5 billion in six patients, between 1:500 million and 1:50,000 in 27 patients, between 1:5,000 and 1:500 in 16 and 1:50 in 50 patients.

TABLE 2.—*Areas Involved in Allergic Dermatitis in 100 Cases*

	Alone	With Other Areas
Head and neck	1	5
Ears	3	3
Eyes	2	10
Face	12	21
Upper extremities	6	4
Lower extremities	2	2
All extremities	10	60
Trunk	3	4
Hands alone	16	
Generalized	32	

TABLE 3.—*Seasonal Incidence of Dermatitis*

	No. of Patients
Spring only	17
Fall only	5
Spring and fall	26
Perennial	17
Perennial with spring exaggeration	17
Perennial with fall exaggeration	4
Perennial with spring and fall exaggeration	14
	100

TABLE 4.—*Results of Skin Tests (Scratch or Puncture Method)*

	No. of Patients Reacting		
	Negative	1 to 2 Plus	3 Plus or Greater
Tree pollens	50	40	9
Spring grass pollens	29	34	33
Fall pollens	39	37	16
Flower pollens	64	32	3
Miscellaneous inhalants	56	35	7
Foods	68	26	3
Completely negative skin tests		24	
Positive reactions to unrelated allergens		18	

The initial desensitizing dose was determined by intradermal serial dilution titration or by the ability of the patient to tolerate a given dose.

In nonreacting patients, composition of the antigen was based on the clinical history and the area of residence. In patients with positive skin reactions antigen composition was determined primarily through careful analysis of the history. Frequently in this group, however, aid was obtained from analysis of skin test results.

Good or excellent therapeutic results were obtained in most patients who had perennial pollen sensitivity by administering desensitization over relatively long periods at intervals of three to seven days. Fifty patients required two years of treatment or less, 37 two to four years and 13 four to eight years (Table 5). Premature cessation of therapy in many patients resulted in exacerbation of the dermatitis. It became apparent that failure to effect

TABLE 5.—*Perennial Pollen Desensitization—Duration of Therapy*

	No. of Patients
3 to 6 months	2
6 to 12 months	21
1 to 2 years	27
2 to 3 years	24
3 to 4 years	13
4 to 6 years	8
6 to 8 years	5

Injections of antigen given every 3 to 7 days

partial or complete remission within a period of one or even two years should not discourage the continuance of treatment. Several patients who noted no significant improvement during the first one or two years of therapy, had the desired relief later.

Clinical results were excellent in 79 cases and good in 21. (*Excellent* denoted complete disappearance of the eruption; *good* was used when the eruption almost completely disappeared or was absent except for minor recurrences for one to four weeks each year.)

That tolerance of strong antigens is not necessary for a good or excellent clinical result was apparent. Seven patients were able to tolerate antigens no stronger than 1:5 billion; 27 no stronger than 1:50,000; and 16 no stronger than 1:500. Fifty patients tolerated dilutions of 1:50. Antigen strength was steadily increased according to patient tolerance. Exacerbation of dermatitis frequently necessitated reduction in dosage both in and out of the pollen seasons. Frequently significant dosage reduction was necessary during the pollen season. The efficacy of small doses of pollen, utilizing extremely weak antigen dilutions as previously pointed out by others,[1,3,9,14] was again emphasized by the experience in this series of patients with pollen dermatitis.

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